CM-2007 Digital Clamp Meter Manual

This meter is precise equipment. Please read this manual carefully before any operation to avoid any damage to you and the meter.

CONTENT

1. SUMMARY

This 3 3/4 Digit Highly Stable clamp meter uses two AAA (1.5V) batteries. It has a LCD with 18mm digit display, which makes the reading clearer and the operation more convenient. It can test DCV, ACV, ACA, resistance, NCV, temperature, diode and continuity test. This meter also equips data hold function with unit symbol display, can work in both auto and manual range, and provides auto power off, clamp light, backlight and warning functions. To assure high accuracy and resolution, it adopts an 8-bit microprocessor and a dual integral A/D convertor IC .It is an ideal tool for labs, factories radio-technology and household.

2. SAFETY NOTICE

The instrument is designed according to IEC1010-1(EN61010-1), Pollution 2, CAT III 600V and UL3111-1 standard (safety standard issued by International Electro technical Committee). Please read the followings carefully before any operation.

2.1 Introduction for safety symbols:

⚠ : Be careful! Operator must refer to manual.

: Low battery indication.

⚠ : Warning! Existing High Voltage.

: Dual Insulation.

2.2 Notice:

2.2.1 Please read the manual carefully and strictly obey the instructions to avoid any human health and meter damage.

2.2.2 To avoid electric shock and damage to the meter, please disconnect the input signal and remove away the test leads before opening the cover. Avoid the water leakage into the cover.

2.2.3 DO NOT do any test if the cover hasn't been completely installed or screws not tightened up.

2.2.4 DO NOT input the value higher than the limit at every range.

2.2.5 DO NOT input any voltage at Resistance range.

2.2.6 Switch OFF the meter after used.

2.2.7 Please take out the batteries for long-time storage to avoid leakage damage.

2.2.8 Be careful when the testing over DCV 60V and ACV 30V..

2.2.9 To avoid electric shock, please be seriously careful when nipping the bus bar or something insulated.

3. FEATURES

3.1 GENERAL FEATURES

3.1.1 Display: LCD.

3.1.2 Max. Display: 4000 digits (3 3/4) and auto polarity display.

3.1.3 Clamp Max.open: 28mm

3.1.4 Over-range display: "OL" displayed.

3.1.5 Hold: DATA HOLD.

3.1.6 Relative measurement.

3.1.7 Sampling rate: approx.3 times/sec.

3.1.8 Low battery indicator: "" displayed.

3.1.9 Continuity test: Approx. less than （50±10）Ω buzzer sounds.

3.1.10 Auto or manual range.

3.1.11 Auto power off.

3.1.12 Power consumption: about 3mA.

3.1.13 Power: 2 × 1.5V batteries (AAA 7#battery).

3.1.14 Working environment: (0～40)℃, relative humidity: <70%.

3.1.15 Dimension: 123mm×270mm×35mm (width×length×height).

3.1.16 Weight: approx. 280g (including batteries).

3.1.17 Accessories: user manual, test leads, temperature sensor banana probe TP01, 2pcs 1.5V batteries, black pouch, gift box

3.2 TECHNICAL FEATURES

3.2.1 Accuracy**:** ± (a% × reading data + digits). To assure accuracy, the environment temperature should be (23±5) ℃, relative humidity be <70%.

One year accuracy guarantee since production date.

3.2.2 Temperature Coefficient: 0.1* Specified Accuracy/1℃ (<18℃ or >28℃)

3.2.3 DC voltage (DCV)

Range	Accuracy	Resolution
400mV	±(1.0% reading+5）	0.1mV
4V	±(0.5% reading+5）	1mV
40V		10mV
400V		100mV

600V		1V

Input impedance: at 400mV range >40MΩ, at other ranges are 10MΩ.

Overload protection: 1000V DC or 750V AC peak value.

3.2.4 AC voltage (ACV)

Range	Accuracy	Resolution
400mV	±(1.5% reading+5）	0.1mV
4V	±(1.0% reading+5）	1mV
40V		10mV
400V		100mV
600V		1V

Input impedance: at 400mV range >40MΩ, at other ranges are 10MΩ.

Overload protection: 1000V DC or 750V AC peak value.

Frequency response: at 600V range: 40~100Hz,

at other ranges:40~400Hz.

Display: average value response (based on sine wave RMS).

3.2.5 AC current (ACA)

Range	Accuracy	Resolution
400A	<40A: ±(3.0% reading+5）	100mA
600A	>40A: ±(2.0% reading+5）	1A

Overload protection: >800A, input time<1 minute.

Frequency response: 40Hz-200Hz.

Display: average value response (based on sine wave RMS).

3.2.6 Resistance

Range	Accuracy	Resolution
400Ω	±(0.8% reading+5）	0.1Ω
4kΩ	±(0.8% reading+3）	1Ω
40kΩ		10Ω
400kΩ		100Ω
4MΩ		1kΩ
40MΩ	±(1.2% reading+5）	10kΩ

Overload protection: 250V RMS.

NOTE: DO NOT input any voltage value at this range!

3.2.7 Capacitance test

Range	Accuracy	Resolution
4nF	±(5.0% reading+20）	1pF
40nF	±(3.5%reading+10）	10pF
400nF		100pF
4uF		1nF
40uF		10nF
200uF	±(5.0%reading+10）	100nF

Overload protection: 250V RMS.

NOTE: DO NOT input any voltage value at this range!

3.2.8 Frequency test

Range	Accuracy	Resolution
100Hz	±(0.5% reading+5）	0.1Hz
1kHz		0.1Hz
10kHz		1Hz
100kHz		10Hz
1MHz		100Hz
10MHz		1kHz

Input sensitivity: >0.7V.

Overload protection: 250V RMS.

3.2.9 Temperature test

Range	Accuracy	Resolution
（-40～750）℃	＜400℃±（1.0%+5） ≥400℃±（1.5%+15）	1℃

Sensor: K type banana plug (Ni-Cr-Nickel silicon).

NOTE: DO NOT input any voltage value at this range!

3.2.10 Continuity Test

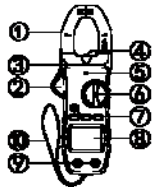
Range	Description	Test Conditions
	Diode forward voltage drop	Forward DC current is approx 0.5mA, reverse voltage is approx 1.5V.
	When the resistance under test is less than 50±10Ω, buzzer sounds continuously.	Open circuit voltage: 0.5V

Overload protection: 250V RMS.

Note: DO NOT input any voltage value at this range!

4. OPERATION

4.1 PANEL DESCRIPTION (refer to picture 1)



⌣ Jaw: 0 to 600 AC current and NCV detecting device.

✍ Clamp gunlock: Pressing the gunlock can turn on or off the clamp.

✛ Hand protection: A safe design to protect users from touching the dangerous area.

☀ Clamp light: Opening the clamp light can light up the tested area in the dark to prevent the danger.

● NCV indicator: Detect the existence of the high voltage around to

prevent the electric shock.

Function choosing switch: Used to select the function, range or turn on or turn off the clamp meter.

Function	Description
A～	ACA measurement.
V⎓	ACV, DCV measurement. Press "SELECT" to switch the measurement mode. Press "Hz/DUTY" to switch to Frequency/Duty cycle measurement mode.
NCV	Non-contact voltage test.
→◀))⊣⊢Ω	Press "SELECT" to switch to Diode, Continuity, Capacitance and Resistance measurement mode.
Hz	Frequency measurement.
℃/℉	Temperature measurement. Press "SELECT" button to switch to ℃ or ℉.

Function key.

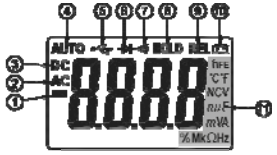
LIGHT button: Backlight and Clamp light control key. Press LIGHT button more than 2 seconds, backlight and clamp light will be on. Press this button again, the backlight and clamp light will be off. The backlight will auto turn off after 5 seconds if not pressing it again.

SELECT button: Function selection key. Press this button to select the measurement mode: Under "⎓" mode, choose DC or AC. Under "→◀))⊣⊢Ω" mode, choose "→◀" "◀))" "⊣⊢", "Ω"measurement.

HOLD button: Press "HOLD" button, the current testing value will be kept displayed on the LCD, and press this button again to cancel this function. When this function works, user cannot do any new test.

REL button: Press this button to clear the readings and enter into the Relative measurement mode and a "REL" symbol will be displayed on the LCD. Press this button again to cancel this function.

LCD: Displaying measurement value and unit.



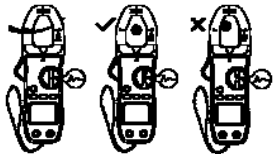
No.	Symbol	Description
	-	Indicates negative readings.
	AC	AC measurement.
	DC	DC measurement.
	Auto	Auto range.
		Null.
		Diode test.
		Continuity beeper is on.
	HOLD	Data hold
	REL	Relative measurement.
		Low battery indication.
	hFE ℃，℉ NCV nF，uF MΩ，kΩ，Ω mV, V uA， mA， A Hz，kHz，MHz	Null. ℉ null. Non-contact voltage testing. nF，uF MΩ，kΩ，Ω mV, V uA， mA， A Hz，kHz，MHz

✕V/Ω input terminal: Measurement inputs positive terminal (red test lead).

COM input terminal: Measurement inputs negative terminal (black test lead).

Carrying belt.

4.2 ACA MEASUREMENT



(1) Turn the rotary switch to A～ range.

(2) Open the clamp jaw and grip one wire and get the reading directly.

To get the most precise reading, should user put the wire in the middle of the close jaw (refer to the picture 3).

Note:

1. Firstly users should select the highest range, if users are not sure about the range of current under test, and then select the proper range based on displaying value.

2. DO NOT input the current higher than the limit, or it would damage the meter.

4.3 ACV MEASUREMENT

(1) Turn the function swift to V～ range.

(2) Insert the black test lead into "COM" terminal, and the red one into "V/Ω" terminal.

(3) Connect the test leads into the circuit and get the measurement value from the LCD. (refer to picture 4)

(picture 4)

Note:

1. DO NOT input the voltage over the limit, or it would damage the meter.

2. Be careful while measuring a high voltage circuit. Do not touch the high voltage circuit.

4.4 DCV MEASUREMENT

(1) Turn the function swift to DCV range.

(2) Insert the black test lead into "COM" terminal, and the red one into "V/Ω" terminal.

(3) Connect test leads to the test point. LCD will display polarity and voltage of the test point connected by the red test lead. (refer to picture 5)

Note:

1. DO NOT input the voltage over the limit, or it would damage the meter.

2. Be careful while measuring a high voltage circuit. Do not touch the high voltage circuit.

4.5 NCV MEASUREMENT

NCV Static electricity or other sources of energy may randomly trigger the sensor. The result is only for reference.

4.5.1 Turn the rotary switch to NCV position.

4.5.2 Hold the top of the meter very close to the voltage source under test.

4.5.3 If voltage is present, the NCV LED will flicker rapidly or intermittently

NOTE:

1. Even no indication when NCV test, there might still voltage be.

Do not use this NCV test function to judge the existence of voltage.

2. The test result might be affected by many factors such as the design of the socket and the thickness of insulation material.

3. The LED light might glow when user inputs voltage into the meter terminal.

4. Flashlight or motor driver and other external sources may cause disturbance and might cause the wrong results.

4.6 DIODE AND CONTINUITY TEST

4.6.1 Set the rotary switch to "→•))) Ω" range. The original state is diode measurement mode.

4.6.2 Forward measurement: Connect red test lead to the positive polarity and the black test lead to the cathode polarity of the diode. LCD will display the approx. value of forward voltage drop.

4.6.3 Backward measurement: connect red test lead to the cathode polarity and the black test lead to positive polarity of the diode. LCD will display "OL".

4.6.4 The complete diode testing includes forward and backward measurement. If the result doesn't meet the descriptions above, it means the diode is broken.

4.6.5 Press "SELECT" key to select the continuity measurement mode.

4.6.6 Insert the black test lead into "COM" terminal, and the red one into "V/Ω" terminal.

4.6.7 Connect test leads to two points of tested circuit, if the resistance is less than (50±10) Ω, the buzzer sounds.

Note:

1. DO NOT input any voltage value at this range!

4.7 RESISTANCE MEASUREMENT

4.7.1 Set the rotary switch to "→•))) Ω" range and press "SELECT" to swift to "Ω" range.

4.7.2 Insert the black lest lead into "COM" terminal and the red one into "V/Ω" terminal.

4.7.3 Connect the test leads to the measured resistance to get the measurement value (refer to picture 8).

Note:

1. Before measuring in line resistor, make sure that the power is off and all capacitors have discharged completely.

2. Do not apply any voltage at resistance range.

3. When input terminal is in open circuit, LCD will display "OL".

4. If there is an "OL" displayed on the LCD, it means it is over range, switch to a higher range. When the test leads are shorted, there would be about 1Ω stray resistance.

4.8 CAPACITANCE TEST

4.8.1 Set the rotary switch to "→•))) Ω" range and press "SELECT" to swift to "⊣⊢" range.

4.8.2 Insert the black test lead into "COM" terminal, and the red one into "V/Ω" terminal (refer to picture 9).

4.8.3 Press "REL" key to clear the reading to make the LCD displayed zero.

4.8.4 Connect the capacitor to "COM" and "V/Ω" terminal. (Note: the red test leads is for positive pole +). LCD displays capacitance value.

Note:

1. Don't input voltage or current at Capacitance range.

2. In order to assure the accuracy, please press "REL" to clear the reading before testing.

3. There is only the auto range mode under the capacitance range.

4. The capacitor must be completely discharged before testing.

5. The reading of 200uF range will take more than 15 seconds to be stable.

4.9 FREQUENCY MEASUREMENT

4.9.1 Turn the function swift to Hz range. Insert the black lest lead in "COM" terminal and the red one in "V/Ω" terminal.

4.9.2 Connect the test leads to the measured circuit and get the measurement value. (Refer to picture 10)

Note:

1. In noisy environment, it's better to use shield cable to measure a low signal.

2. When measuring high voltage circuit, do not touch the high voltage circuit.

3. Don't input voltage higher than 250V RMS or it may damage the meter.

4.10 TEMPERATURE TEST

4.10.1 Set the rotary switch to "℃" range.

4.1.12 Insert the black plug of the thermocouple sensor into "COM" and red one into "V/Ω" jack, and put the working terminal (temperature measuring end) of thermocouple on the surface or inside the object to be tested. Then you can read temperature from the screen, and the data is in Centigrade. (Refer to picture 11)

Note:

1. The meter should be far away high temperature. Use the thermocouple probe within the specified temperature range.

2. Don't change the temperature probe randomly, or the accuracy will not be guaranteed.

3. Don't input voltage at temperature range.

4.11 AUTO POWER OFF

4.11.1 The meter will auto power off if there is not any operation in 15 minutes and come into dormant mode. The beeper will sound five times within 1 minute before power-off.

To restart the meter, please press any function key or turn to the function swift.

4.11.2 Press "SELECT" key and turn on the meter or press "SELECT" when the meter is in dormant mode to wake up the meter and the "AUTO POWER OFF" function will be cancelled

5. MAINTENANCE

The meter is a precise instrument. Random changes to the circuit should be avoided.

Note:

1. When the LCD displays "🔋", please exchange the battery in time.

2. Before replacing battery or fuse, please remove the test leads from the measuring point and turn off the power.

3. Keep the meter away from water, dust and shock.

4. DO NOT use the meter under high temperature, high humidity, combustible, explosive and strong magnetic environments.

5. Clean the case of the meter regularly with cleaner. DO NOT use corrosive solvents, combustible, explosive and strong magnetic environments.

6. TROUBLE SHOOTING

If the meter does not work properly, please check the meter as following steps:

(If the problems still cannot be solved, please refer to repairing center or contact the local dealers.)

Fault	Solution
No reading on LCD	■ Turn on the power ■ Replace battery ■ Release the HOLD key
signal appears	■ Replace battery
Big error Value	■ Replace battery

- The specifications are subject to changes without prior notice.
- The content of this manual is regarded as correct. If users find out any mistakes or omissions, please kindly contact the manufacturer.
- The manufacturer will not be responsible for accidents and damage caused by improper operations.
- The functions described in this User Manual shall not be considered as the reason for any special usages.